RDECOM

Media Advisory

TARDEC

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72-Hour Collaboration Leads to Safer Vehicle Restraint Systems for Soldiers

DETROIT ARSENAL, WARREN, MI — Seventy-two hours to save Soldiers' lives. Seventy-two hours to assess, design, fabricate, integrate, test, adapt and produce a universal restraint system to ensure gunners won't be thrown from Mine Resistant Ambush Protected (MRAP) vehicles in the event of an accident or vehicle rollover.

That was the task U.S. Army Tank Automotive Research, Development Engineering Center (TARDEC) engineers and technicians were given the evening of Sept. 24 to protect turret gunners on the MRAP, who are positioned at a gunners hatch in the top of the vehicles.

The TARDEC Prototype Integration Facility (PIF) immediately began adapting an existing 5-point restraint harness and retractor used in the High Mobility Multipurpose Wheeled Vehicle (HMMWV). "There were several challenges to overcome," said Senior Engineer Mike Manceor. "No drawings or Computer Aided Design (CAD) models were available, and no two MRAP variants share the same bolt hole patterns."

Designers had to climb into vehicles and physically measure the hole patterns. Designers Jim Mason and John Maniaci assisted Senior Engineer Joe Siwicki make detailed drawings from the measurements he took. In the meantime, collaborative efforts were coordinated with the Edgewood Chemical Biological Center (ECBC) PIF and Aberdeen Test Center (ATC), both located at Aberdeen Proving Ground (APG). While TARDEC engineers were developing designs, fabricating and integrating a prototype for one of the seven MRAP variants, the TARDEC Advanced Collaborative Environment (ACE)Team worked to make the CAD data that was available to the team. At the same time, the Research, Development and Engineering Command's (RDECOM's) PIF Advocate Gary Doggett traveled to ATC, offering support where needed.

On Sept. 26, less than 48 hours after receiving the tasking, TARDEC's MAJ Anh Ha and CW3 Jason Greegor led a team of TACOM Life Cycle Management Command (LCMC) Soldiers in conducting a human factors operational evaluation to assess the design and provide feedback from a user perspective. The physical testing and human factors engineering were coordinated with TARDEC's Physical Simulation Team, TACOM LCMC Safety Office and ATC.

TARDEC PIF Project Engineer Floyd Helsel made 10 kits Friday, and Siwicki arrived at APG Saturday to guide ATC technicians in the installation of Helsel's kits which had been delivered overnight.

The entire TARDEC team worked through the weekend, and Siwicki worked with ECBC and TARDEC Engineers to develop, fabricate and integrate a solution for one variant not available at TARDEC. With the basic concept already developed and ECBC so close to APG, this solution seemed the best for changes and deliveries of prototypes and testing.

Within 48 hours, TARDEC's design engineers were ready to make design changes following the testing, and PIF engineering technicians were ready to fabricate any new components should test results indicate a fix was needed. "Everything progressed smoothly and we felt prepared for any contingency," stated TARDEC PIF Associate Director Jim Soltesz. "It was an outstanding team and collaborative effort."

By Sunday evening two basic designs, one for five of the vehicles and another for the remaining two, were complete. ECBC fabricated mounting hardware, engineers from each PIF pooled drawing updates and RDECOM Commanding General MG Fred D. Robinson Jr. issued the following note, "This is great work by the whole team. It also shows how far we have come as a command when [TARDEC] engineers are tied in with the ECBC … to maximize time and effort."

The push had ended, but work continued. TARDEC provided designs and 50 Gunner's Kit platform plates to Blue Grass Army Depot Sept. 28 and supported Rock Island Arsenal, IL, with manufacturing. Designs, prototypes and bill of materials for all vehicles were completed, and kits were fabricated, assembled and shipped to theater. The new restraint systems will ensure the safety of all turret gunners in vehicle accidents and rollovers.

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Note: There are three photos and two graphic images available for use with this release. Caption information follows. To download the photo, go to http://www.tardec.info/pressreleases/.

Captions:

TARDEC-PR-GRS_1_Manceor.jpg
TARDEC Engineer Mike Manceor measures bolt hole locations on an MRAP gunner's platform for a restraint system. TARDEC PIF engineers and engineering technicians worked closely with ECBC and ATC personnel to create two universal systems in three days. (U.S. Army TARDEC photo by Bill Dowell.)

TARDEC-PR-GRS_2_Engineers.jpg

From left: TARDEC Engineers Mike Manceor, Keith Sheridan and Jim Mason measure and record current bolt hole locations to ensure a universal MRAP Gunner Restraint System will fit another variant. TARDEC employees worked closely with ECBC, APG, ATC and LCMC personnel to ensure the systems were safe for Soldiers. (U.S. Army TARDEC photo by Bill Dowell.)

TARDEC-PR-GRS_3_CC.jpg
TARDEC Military Deputy LTC Andres Contieras (left) discusses the MRAP GRS with TARDEC Director Dr. Grace M. Bochenek (center) and TACOM LCMC Commanding General MG Scott G. West (right). TARDEC PIF engineers and engineering technicians spent 72 hours designing the Gunner Restraint System for MRAP vehicles. (U.S. Army TARDEC photo.)

TARDEC-PR-GRS_4_31.jpg
Engineer CAD rendering of one MRAP Gunner Restraint System variant. TARDEC and ECBC engineers and engineering technicians developed two universal kits to fit seven different vehicle variants. (U.S. Army TARDEC drawing.)

TARDEC-PR-GRS_5_Cougar.jpg
An Engineer CAD rendering of an MRAP Cougar variant Gunner Restraint System. TARDEC engineers and design engineers began the entire restraint process by physically measuring potential bolt hole locations in MRAP vehicles. (U.S. Army TARDEC drawing.)

TARDEC is the Nation's laboratory for advanced military ground systems and automotive technology. A leading technology integrator for the U.S. Army Materiel Command's Research Development and Engineering Command (RDECOM), TARDEC is headquartered at the Detroit Arsenal in Warren, MI, located in the heart of the world's automotive capitol. TARDEC is a major element of RDECOM and partner in the TACOM Life Cycle Management Command. As a full life-cycle engineering support provider-of-first-choice for all DOD ground combat and combat support weapons and vehicle systems, TARDEC develops and integrates the right technology solutions to improve Current Force effectiveness and provide superior capabilities for the Future Force. TARDEC's technical staff leads research in ground vehicle survivability; mobility/power and energy; robotics and intelligent systems; maneuver support and sustainment; and vehicle electronics and architecture. TARDEC develops and maintains ground vehicles for all U.S. Armed Forces and numerous federal agencies.

For additional information about TARDEC's forthcoming developments and other technologies, please contact Mike Roddin at Mike.Roddin@us.army.mil.